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EXAMINER	
NORTON, JENNIFER L	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/780,204	SHAPIRO ET AL.
	Examiner	Art Unit
	Jennifer L. Norton	2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The following is a **Non-Final Office Action** in response to the Request for Continued Examination filed on 27 March 2007. Claims 1, 9, 11, 12, 14 and 17 have been amended. Claims 1-17 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-5, 7-10, 12-13 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,901,300 (hereinafter Blevins) in view of U.S. Patent No. 4,823,299 (hereinafter Chang).

4. As per claim 1, Blevins teaches to a method for controlling a controlled operation by determining a lag in measured data from at least one actual variable signal, comprising:

processing the measured data using time-series analysis with a filter to produce filtered data with reduced noise content (col. 4, lines 29-34, col. 10, lines 13-16 and Fig. 3, element 60);

arranging the filtered data in matrices with one column for each actual variable signal (col. 9, lines 55-58 and Fig. 3, element 53);

processing data with a variable signal estimator to output a variable signal function for each actual variable signal that defines each actual variable signal in terms of its mathematical dependencies on all of the variable signals (col. 10, lines 6-9 and 43-48);

processing each actual variable signal function with a criterial function to provide an optimal lag value for each actual variable signal (col. 9, lines 66-67, col. 10, lines 1-3, col. 12, lines 65-67 and col. 13, lines 1-10);

processing data with a lag estimator to output a lag function for each lag, each lag function defining each lag in terms of its mathematical dependency on all of the actual variable signals (col. 13, lines 30-38);

determining the goodness of fit of each lag function based on the most recent filtered data (col. 16, lines 56-67);

storing at least one lag function based on its goodness of fit (col. 17, lines 16-17); and

discarding at least one lag function based on its goodness of fit (col. 17, lines 4-16).

Blevins does not expressly teach to shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix

Chang teaches to shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the data for each actual variable signal (col. 6, lines 16-19) and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix (col. 4, lines 56-58 and Equation 7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the data for each actual variable signal and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix to produce real time solutions to input signals (col. 2, lines 26-30).

5. As per claim 2, Blevins as set forth above teaches the filter is a 1-D filter (col. 10, lines 17-19).

6. As per claim 3, Blevins as set forth above teaches the filter is a time series approximator (col. 10, lines 17-19).

7. As per claim 4, Blevins as set forth above teaches the filter is an n-D filter (col. 10, lines 17-19).

8. As per claim 5, Blevins as set forth above teaches the variable signal estimator is a neural network (col. 6, lines 44-49).

9. As per claim 7, Blevins does not expressly teach the point calculation algorithm averages the values of each column in a given matrix to produce a point for each column in each shifted matrix.

Cheng teaches to the point calculation algorithm averages the values of each column in a given matrix to produce a point for each column in each shifted matrix (col. 4, lines 56-58 and Equation 7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include a point calculation algorithm which averages the values of each column in a given matrix to produce a point for each column in each shifted matrix to produce real time solutions to input signals (col. 2, lines 26-30).

10. As per claim 8, Blevins as set forth above teaches the lag estimator is a neural network (col. 6, lines 44-49).

11. As per claim 9, Blevins teaches a method for controlling a controlled operation by determining a lag in measured data from at least one actual variable signal, comprising:

arranging the data in matrices with one column for each actual variable signal (col. 9, lines 55-58 and Fig. 3, element 53);

processing data with a variable signal estimator to output a variable signal function for each variable signal that defines each variable signal in terms of its mathematical dependencies on all of the variable signals (col. 10, lines 6-9 and 43-48); and

processing each variable signal function with a criterial function to provide an optimal lag value for each variable signal (col. 9, lines 66-67, col. 10, lines 1-3, col. 12, lines 65-67 and col. 13, lines 1-10).

Blevins does not expressly teach shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal.

Chang teaches to shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal (col. 6, lines 16-19).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal to produce real time solutions to input signals (col. 2, lines 26-30).

12. As per claim 10, Blevins as set forth above teaches the variable signal estimator is a neural network (col. 6, lines 44-49).

13. As per claim 12, Blevins teaches a method for controlling a controlled operation by determining the lag in measured data from at least one variable signal, comprising:

arranging the data in matrices with one column for each actual variable signal (col. 9, lines 55-58 and Fig. 3, element 53);

processing data with a variable signal estimator to output a variable signal function for each variable signal that defines each actual variable signal in terms of its mathematical dependencies on all of the actual variable signals (col. 10, lines 6-9 and 43-48);

processing each actual variable signal function with a criterial function to provide an optimal lag value for each variable signal (col. 9, lines 66-67, col. 10, lines 1-3, col. 12, lines 65-67 and col. 13, lines 1-10);

processing data with a lag estimator to output a lag function for each lag, each lag function defining each lag in terms of its mathematical dependency on all of the variable signals (col. 13, lines 30-38).

Blevins does not expressly teach shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal; and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix.

Chang teaches to shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal (col. 6, lines 16-19); and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix (col. 4, lines 56-58 and Equation 7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include shifting the columns of the matrices to produce a plurality of different shifted matrices, each shifted matrix having a given value for the lag in data for each actual variable signal; and processing each shifted matrix with a point calculation algorithm to produce a point for each column in each shifted matrix to produce a point for each column in each shifted matrix to produce real time solutions to input signals (col. 2, lines 26-30).

14. As per claim 13, Blevins as set forth above teaches the variable signal estimator is a neural network (col. 6, lines 44-49).

15. As per claim 15, Blevins does not expressly teach the point calculation algorithm averages the values of each column in a given matrix to produce a point for each column in each shifted matrix.

Cheng teaches the point calculation algorithm averages the values of each column in a given matrix to produce a point for each column in each shifted matrix (col. 4, lines 56-58 and Equation 7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include the

point calculation algorithm averages the values of each column in a given matrix to produce a point for each column in each shifted matrix to produce a point for each column in each shifted matrix to produce real time solutions to input signals (col. 2, lines 26-30).

16. As per claim 16, Blevins as set forth above teaches to the lag estimator is a neural network (col. 6, lines 44-49).

17. As per claim 17, Blevins teaches a method for determining a lag in measured data from an actual variable signal, comprising:

filtering the measured data (col. 4, lines 29-34, col. 10, lines 13-16 and Fig. 3, element 60);

arranging the measured data into matrices, including one column for each actual variable signal (col. 9, lines 55-58 and Fig. 3, element 53);

processing each variable signal function with a criterial function to produce an optimal lag value for each actual variable signal (col. 9, lines 66-67, col. 10, lines 1-3, col. 12, lines 65-67 and col. 13, lines 1-10);

processing each lag value and each optimal lag value with lag estimator to output lag function for each lag (col. 13, lines 30-38); and

determine its goodness of fit for each lag function (col. 17, lines 4-16).

Blevins does not expressly teach to producing a plurality of shifted matrices with a value for the lag data for each actual variable signal; processing each shifted matrix to output a variable signal function for each actual variable signal; and processing each shifted matrix with a point calculation algorithm to produce a lag value for each column in each shifted matrix.

Chang teaches producing a plurality of shifted matrices with a value for the lag data for each actual variable signal (col. 6, lines 16-19); processing each shifted matrix to output a variable signal function for each actual variable signal (col. 6, lines 16-19); and processing each shifted matrix with a point calculation algorithm to produce a lag value for each column in each shifted matrix (col. 4, lines 56-58 and Equation 7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of the applicant's invention to modify the teaching of Blevins to include producing a plurality of shifted matrices with a value for the lag data for actual each variable signal; processing each shifted matrix to output a variable signal function for each actual variable signal; and processing each shifted matrix with a point calculation algorithm to produce a lag value for each column in each shifted matrix to produce real time solutions to input signals (col. 2, lines 26-30).

18. Claim 6, 11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blevins in view of Chang in further view of U.S. Patent 4,349,869 (hereinafter Prett).

19. As per claim 6, Blevins and Chang do not expressly teach the criterial function utilizes optimization methods to provide an optimal lag value for each variable signal.

Prett teaches to a criterial function utilizes optimization methods to provide an optimal value for each variable signal (col. 8, lines 2-7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of Blevins in view of Chang to include a criterial function utilizing optimization methods to move the controlled variable towards its optimum setpoint and to predict where the process is going, and to compensate in the present moves to control any further problems (col. 3, lines 5-11).

20. As per claim 11, Blevins and Chang do not expressly teach the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal.

Prett teaches to the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal (col. 8, lines 2-7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of Blevins in view of Chang to include the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal to move the controlled variable towards its optimum setpoint and to predict where the process is going, and to compensate in the present moves to control any further problems (col. 3, lines 5-11).

21. As per claim 14, Blevins and Chang do not expressly teach the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal.

Prett teaches to the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal (col. 8, lines 2-7).

Therefore it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to modify the teaching of Blevins in view of Chang to include the criterial function utilizes optimization methods to provide an optimal lag value for each actual variable signal to move the controlled variable towards its

optimum setpoint and to predict where the process is going, and to compensate in the present moves to control any further problems (col. 3, lines 5-11).

Response to Arguments

22. Applicant's arguments see Remarks pgs. 7-9, filed 27 March 2007 with respect to claims 1-17 under 35 U.S.C. 103(a) have been fully considered but they are not persuasive.

23. Applicant argues that the prior art fails to teach, an "actual variable signal". The examiner respectfully disagrees.

The Examiner cannot interpret the term "actual" to mean "sensed" or "measured", since the Applicant has not defined or disclosed the term "actual" in the Specification. Therefore, the Examiner has interpreted "actual" with the "plain meaning" which is broad enough to include calculated data; because calculated data is "actual" data.

24. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "The determination of goodness of fit of any function involves measuring any one of the known goodness of fit characteristics, such as the mean squared error,

the Kolmogorov Smirnov statistic, the Pearson's correlation coefficient, etc...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

25. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "given a stream of values of k process variables arranged into k columns, a snapshot of n time scans is taken, resulting in an n-by-k matrix (containing n values of k process variables). Next, each column of that matrix is shifted by predetermined values (optimal values of each shift will turn out to be the desired values of the lag of the variable signal).") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

26. Applicant argues that the prior art teaches, "a specific optimization procedure wherein an optimum number of moves in the ith manipulated variable is found." This method of optimization is not excluded by the claim limitations; hence, the Prett reference meets the claim limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer L. Norton whose telephone number is 571-272-3694. The examiner can normally be reached on 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 571-272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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